

PROGRAMMATIC DESIGN SPACE EXPLORATION THROUGH VALIDITY

FILTERING AND QUALITY FILTERING

Abstract

5 Design spaces for systems, including hierarchical systems, are programmatically validity filtered and quality filtered to produce validity sets and quality sets, reducing the number of designs to be evaluated in selecting a system design for a particular application. Validity filters and quality filters are applied to both system designs and component

10 designs. Component validity sets are combined as Cartesian products to form system validity sets that can be further validity filtered. Validity filters are defined by validity predicates that are functions of discrete system parameters and that evaluate as TRUE for potentially valid systems. For some hierarchical systems, the system validity predicate is

15 a product of component validity predicates. Quality filters use an evaluation metric produced by an evaluation function that permits comparing designs and preparing a quality set of selected designs. In some cases, the quality set is a Pareto set or an approximation thereof.